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July 3, 2012

Matt Hicks
Senior Hydrologist
Groundwater Quality Program
South Dakota Department of Environment & Natural Resources
523 East Capitol Avenue
Joe Foss Building
Pierre, SD 57501-3182

Re: Additional Response to May 25, 2012 Preliminary Technical Comments
Dewey-Burdock Project Groundwater Discharge Plan Application

Dear Mr. Hicks:

On behalf of Powertech (USA) Inc., this letter is provided in response to the May 25, 2012 preliminary technical comments for the above referenced application for a Groundwater Discharge Plan (GDP). This letter includes responses not included in the June 18, 2012 response letter to two of the technical comments, a related typographical issue, and a general comment. For convenience, the applicable comments are provided below along with the responses. Application replacement pages are enclosed along with an index of changes (two hard copies and one electronic copy on CD).

Technical Comment 1: On Figure 3.6-4, the lithology and water levels depicted on the cross sections do not appear to correspond to the lithology and water levels described on the alluvial drill hole logs in Appendix 3.6-A or the features on the map on Figure 3.6-4. Please correct these discrepancies and submit larger depictions of the two cross sections to include geology/ hydrology data from the alluvial drill hole logs. If additional drill hole logs were used to construct these cross sections, please identify them on the cross sections and map, and include the logs with the application.

Response: Powertech (USA) has revised the Pass Creek alluvial cross sections, which were previously presented in Figure 3.6-4. The revised cross sections are provided on Plate 3.6-10. The lithology and water levels shown on the cross section match the alluvial drill hole logs presented in Appendix 3.6-A. When updating the cross sections, Powertech (USA) noticed that one of the alluvial water level measurements appears to have been recorded in error. This erroneous water level was not used to show the static water level elevation on the applicable cross section, nor was it used to generate the potentiometric contour map (Figure 3.7-8). This is noted on the cross section. A replacement log acknowledging the recording error is included with this response package.

Technical Comment 16: Several sections and figures in the application discuss collection areas, berms and catchment areas; however, the application is not very clear about these areas. Please elaborate and include discussions on the locations of collection areas, catchment areas, land application berms and catchment area berms; construction of the berms around both the catchment areas and land application areas (include a typical cross section construction design

that traverses the land application berms, land application area, catchment area, catchment area berms and collection area); and how water is to be conveyed to the collection and catchment areas. Please also include a discussion of berm elevation and design freeboard.

Additionally, as the SPAW model is a one-dimensional model that does not include flow routing or channel descriptors, please include a discussion and map indicating where in the collection or catchment areas, standing water likely is to occur, how much standing water may be anticipated during normal operations and during heavy precipitation events, the impacts this standing water would have on groundwater, and what threshold levels of runoff and/or standing water would trigger land application rates to be adjusted to mitigate and eliminate ponding or standing water.

Response: A conceptual design and operating plan for the catchment areas has been added to the GDP application. Following is a description of the conceptual design and operating plan. Prior to operation of the land application systems, Powertech (USA) will submit final designs of the catchment areas as indicated below.

Conceptual Catchment Area Design

Plates 5.4-1 and 5.4-2 present the conceptual designs of the Dewey and Burdock catchment areas, respectively. The final designs may vary from those shown on the plates but will include a minimum surface area of 35 acres at each of the Dewey and Burdock sites and sufficient capacity to contain the estimated 100-year, 24-hour runoff event from all center pivot areas and contributing drainage areas.

The conceptual designs include multiple catchment areas for each of the Dewey and Burdock sites. Earthen catchment berms typically will be constructed at the downgradient edges of the pivot areas or in common locations downgradient of multiple pivot areas. Catchment berms typically will be less than 6 feet high or will have an impounding capacity (excluding incised capacity) less than or equal to 15 acre-feet. Therefore, they are anticipated to be classified as "barriers" according to ARSD 74:02:08:01(7) and not require consideration of dam safety requirements in ARSD 74:02:08. Only one of the conceptual designs includes a capacity greater than 15 acre-feet and berm height greater than 6 feet (B-15 in the Burdock area). In this case the catchment area will be incised sufficiently such that the impounding capacity will be 15 acre-feet or less.

For each catchment area, the runoff volume resulting from the 100-year, 24-hour precipitation event was calculated. The 100-year, 24-hour general storm runoff was estimated using the Natural Resource Conservation Service triangular hydrograph method, a parametric method of estimating flood peaks and volumes from drainage area, relief, soil type, vegetative cover and stream length. The precipitation value (4.8 inches) for the 100-year, 24-hour storm event was obtained from the national depth-duration frequency map. This is the same value used for the flood analysis of Pass Creek and ephemeral tributaries within the project area described in Section 3.7.1.3 of the GDP application.

Summary tables are presented on each plate describing the individual and combined area and volume of the conceptual catchment areas and the estimated 100-year, 24-hour storm runoff volumes. In the conceptual design, the combined area is about 70 acres for each site, which is about twice the minimum area of 35 acres described in Section 5.4 of the GDP application. The combined capacity is 141 to 167 acre-feet, which is approximately 18 to 50% more than the total estimated 100-year, 24-hour runoff volume.

In most cases, the catchment areas will have excess capacity beyond the minimum required to contain the 100-year, 24-hour runoff event. The elevation corresponding to the excess capacity volume, where applicable, is designated on each area capacity table on Plates 5.4-1 and 5.4-2. This is termed "inactive capacity" on the plates and represents the normal operating level for each catchment area. As described below, a dewatering program will be initiated if the catchment areas fill above the normal operating level.

In a few cases, two or more catchment areas will be used to contain the 100-year, 24-hour storm runoff volume from multiple drainage areas. In these cases, overflow from upgradient catchment areas will be routed to a downgradient catchment area as indicated on the plates. The overflow will be conveyed in pipelines and/or ditches sized to convey the excess runoff at non-erosive velocities during the 100-year, 24-hour runoff event. In one or more cases berms with catchment ditches will be constructed at the edges of pivot areas to convey the runoff within the pivot areas to the catchment areas (i.e., the pivot area associated with Catchment D-13 in the Dewey land application area).

As requested, typical cross sections are provided on the plates traversing multiple pivot and catchment areas. The plates also depict the relationship between the conceptual catchment area designs and the general catchment area boundaries depicted on other figures and plates in this application (e.g., Figure 2.3-2 and Plates 3.6-5 through 3.6-10). The conceptual designs are within the general boundaries. The actual extents of the catchment areas also will be within or very close to the general catchment area boundaries depicted in the GDP application. The actual extents will be determined during final design as described below.

Conceptual Catchment Area Operating Plan

Powertech (USA) will operate the catchment areas to maintain adequate freeboard capacity for the estimated 100-year, 24-hour storm runoff. This will be accomplished by marking the elevation of the normal operating level in each catchment area, or, in the case of multiple catchment areas operated in series, marking the elevation of the normal operating level in the most downgradient catchment area. The normal operating level will be delineated with a clearly visible marker such as a post. Each catchment area will be routinely monitored, including after significant precipitation events.

The land application water will be applied at an agronomic rate to prevent runoff into the catchment areas except during significant precipitation or snowmelt events. If a catchment area fills above the normal operating level, a dewatering program will be initiated. The catchment area will be dewatered through pumping or gravity discharge. The excess water will be conveyed

to another catchment area with excess operating capacity, pumped to the storage ponds, or pumped to a land application pivot area (primary or standby area).

The conceptual catchment area design includes sufficient excess capacity such that dewatering would not be required frequently. This is demonstrated by the calculated 2-year, 24-hour runoff volumes listed on the summary tables on Plates 5.4-1 and 5.4-2. These runoff volume estimates are provided to illustrate how the catchment areas would be operated during a more frequent precipitation event. In each case, the total 2-year, 24-hour runoff volume is approximately equal to or less than the excess capacity, which is calculated as the total catchment capacity less the designated freeboard volume for the 100-year, 24-hour storm event. In the Dewey area, the conceptual catchment capacity is approximately 167 acre-feet and the 100-year, 24-hour runoff volume is approximately 111 acre-feet. The excess capacity is therefore about 56 acre-feet, or about 300% of the 2-year, 24-hour runoff volume of about 18 acre-feet. In the Burdock area, the excess capacity is about 22 acre-feet, which is approximately equal to the 2-year, 24-hour runoff volume of 23 acre-feet. This shows that the frequency at which the normal operating level would be exceeded for the combined catchment areas would typically be less than or equal to every 2 years. In this case the excess water would be pumped to a pivot area (likely a standby pivot area) or to the storage ponds. The final operating plan described below would include standard operating procedures to ensure that there would be adequate storage pond excess capacity or standby pivot areas to ensure that dewatering could be accomplished in a reasonable amount of time.

The calculation of 2-year, 24-hour runoff volumes for the catchment areas also demonstrates that the quantity of water evaporating or infiltrating in the catchment areas will be much smaller than the quantity of water applied to the land application areas. As described in Tables 5.1-1 and 5.2-1 in the GDP application, the design average annual application volume is 500 acre-feet for each land application system. By comparison, the calculated 2-year, 24-hour runoff volume for the catchment areas is about 18 to 23 acre-feet. This shows that the volume of runoff captured during a storm event that is predicted to occur every other year will only be about 4 to 5% of the design land application volume each year. This supports the conclusion that the catchment areas will have minimal potential groundwater impacts compared to the land application areas.

Final Design and Operation and Maintenance Plan

Prior to operating the land application systems, Powertech (USA) will provide the following information to DENR for review and approval:

1) Final catchment area designs, including hydrologic calculations for the 100-year, 24-hour runoff volumes, catchment area capacities and areas, normal operating levels, berm dimensions, overflow hydraulic designs, and dewatering systems;
2) As-constructed drawings showing the surveyed staged storage capacity, berm dimensions and elevations of the normal operating levels (which will be identified in the field by highly visible markers with the location shown on the as-constructed drawings);
3) Demonstration that water rights have been obtained for all catchment areas, if applicable;
4) Demonstration of catchment area compliance with Safety of Dams regulations in ARSD 74:02:08; and

5) An operation and maintenance (O&M) plan for the Dewey and Burdock sites that includes:
    a. Inspection procedures, including operating level monitoring frequency and berm inspection frequency;
    b. An operation plan describing the overflow and dewatering procedures; and
    c. A dewatering plan describing how each catchment area will be dewatered in the event that the water level exceeds the normal operating level.

Typographical Issue 2: On Figure 3.6-4, the cross sections show a feature with grey shading, but do not identify it. Please identify or otherwise label this feature. Please also identify the light green circles that are shown on the map, in the legend.

Response: As discussed in the response to Technical Comment 1, Figure 3.6-4 has been replaced by Plate 3.6-10, which includes a legend for all features.

General Comment: The Department agrees with the locations of the proposed interior and compliance point monitoring wells, however as the technical review continues and additional ground water information becomes available, the need for additional wells may be considered. Construction of the proposed wells should begin as soon as possible so that ambient sampling can be conducted in accordance with ARSD 74:54:02:18. Ambient sampling should also be conducted at the surface water sampling locations identified on Table 6.2-1.

Response: Powertech (USA) plans to drill the alluvial compliance wells during the week of July 9 and begin collecting samples during the month of July. Based on recent meetings with DENR staff, Powertech (USA) understands that the ambient sampling data for the compliance wells is the primary focus of this request for ambient monitoring, since compliance limits will be established based on the sample results. Powertech (USA) does not propose to begin the 12 months of stream sampling at this time due to the following considerations:

- As described in Section 4.1.1.1 of the GDP application, Powertech (USA) established stream sampling sites on Beaver Creek and Pass Creek and visited the sites monthly for 12 months in 2007-2008. Grab samples were collected from the Beaver Creek sites each month, when available, and passive samplers were installed on Pass Creek.
- While the ambient stream sampling results describe in Section 4.1.1.2 of the GDP application demonstrated significant seasonal variability (especially on Beaver Creek, where flow occurred throughout the year), there was little variation between upstream and downstream sampling locations during the same sampling event. This demonstrates that the temporal water quality variation likely is much greater than the spatial variation on the portions of Beaver Creek and Pass Creek near the project area. Therefore, Powetech (USA) expects similar ambient water quality at the proposed operational monitoring locations depicted on Figure 6.2-1 as the respective previous monitoring locations depicted on Figure 4.1-1 (i.e., the water quality at BVC11 is anticipated to be very similar to the water quality at BVC01 at any given point in time).

- Powertech (USA) has committed to collecting 12 months of ambient surface water data from the locations identified in Table 6.2-1 prior to operation of the Dewey-Burdock Project. The results will be provided to DENR prior to operation of the land application systems.

Please also note that Section 6.1.1.3 of the GDP application commits to sampling all interior wells a minimum of four times within a 6-month period prior to operation of the land application systems.

Thank you for the prompt technical review. Please direct any questions regarding these comment responses to Richard Blubaugh at (303) 790-7528 or Jack Fritz at (307) 672-0761.

Sincerely,

Jack W. Fritz

Jack Fritz, P.E.
WWC Project Manager

cc: Richard Blubaugh
Mark Hollenbeck
John Mays
Ronald Burrows, U.S. NRC
Valois Shea, U.S. EPA, Region 8
Marian Atkins, BLM

Encl: Change Index
Replacement Pages

K:\Powertech\12091\Corres\GDP Technical Review Responses_First_Round_Additional.doc

Docket 40-9075 files for ADAMS

GDP_Change_Index.pdf
GDP_Technical_Comment_Responses_2012-07-03.pdf
Appendix 3.6-A pg 3.6A-10.pdf
Plate 3.6-10 Pass Creek Alluvium Cross Sections.pdf
Plate 5.4-1 Conceptual Dewey Catchment Area Design.pdf
Plate 5.4-2 Conceptual Burdock Catchment Area Design.pdf
GDP_Replacement_Pages_July_2012.pdf